

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference  AMS.P52317WO	<b>FOR FURTHER ACTION</b> <small>see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, Item 5 below.</small>	
International application No.  PCT/GB 03/04476	International filing date (day/month/year)  13/10/2003	(Earliest) Priority Date (day/month/year)  12/10/2002
Applicant  WESTERNGECO SEISMIC HOLDINGS LIMITED		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1  
☐ None of the figures.

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/GB 03/04476

**Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)**

A method and apparatus for determining a position of an acoustic receiver (121-126) are disclosed. The method includes determining a first plurality of acoustic ranges from at least a first signal source position (110) and a second signal source position (115), respectively, to the acoustic receiver (121-126); ascertaining a non-acoustic constraint on the acoustic receiver's position; and determining the acoustic receiver's position from the first and second acoustic ranges and the non-acoustic constraint. The apparatus includes at least one acoustic source (110, 115); an acoustic receiver (121-126), and a computing system. The acoustic receiver is capable of receiving a plurality of acoustic signals transmitted by the at least one acoustic source from at least two signal source positions. The computing system is programmed to determine a position of the acoustic receiver from the acoustic ranges between the at least two signal source positions (110, 115) and the acoustic receiver and a non-acoustic constraint.

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**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 G01V1/38

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 G01V

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 641 287 A (NEELEY WALTER P) 3 February 1987 (1987-02-03)  column 1, line 61 - column 2, line 6 column 2, line 26 - line 32 column 2, line 53 - column 3, line 17 column 3, line 20 - line 25 figure 1	1-4, 8-22, 26, 27
Y	---	5-7, 23-25
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

**\* Special categories of cited documents:**

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*8\* document member of the same patent family

Date of the actual completion of the international search

29 January 2004

Date of mailing of the international search report

18/02/2004

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/03/04476

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>US 4 376 301 A (ROBERTS F ALEX) 8 March 1983 (1983-03-08)</p> <p>column 2, line 10 - line 34 column 3, line 4 - line 8 column 3, line 14 - line 30 column 4, line 34 - line 40 figure 1</p>	1-3, 8-10, 13-22, 26,27
X	<p>FR 2 620 536 A (GEOPHYSIQUE CIE GLE) 17 March 1989 (1989-03-17)</p> <p>page 3, line 10 -page 4, line 5 page 6, line 28 -page 7, line 4 page 7, line 23 -page 8, line 4 figures 1A,1B</p>	1-3, 8-10, 13-22, 26,27
Y	<p>WO 84 03153 A (KONGSBERG VAPENFAB AS) 16 August 1984 (1984-08-16) page 10, paragraphs 3,4</p>	5-7, 23-25
X	<p>COURT I N: "STREAMER COMPASS VALIDATION AND VERIFICATION" GEOPHYSICS, SOCIETY OF EXPLORATION GEOPHYSICISTS. TULSA, US, vol. 58, no. 4, 1 April 1993 (1993-04-01), pages 589-592, XP000367520 ISSN: 0016-8033 page 590, right-hand column -page 592, left-hand column page 592, right-hand column, line 2 - line 4</p>	1,13
A	<p>COURT I.N.: "Applications of acoustics to source-array and streamer tow-point positioning" GEOPHYSICS, SOCIETY OF EXPLORATION GEOPHYSICISTS, vol. 56, no. 4, 1 April 1991 (1991-04-01), pages 558-564, XP002268555 page 559 page 561 figures 1,2</p>	1,5-7, 13,23,24
A	<p>US 4 715 018 A (BLAIR RONALD B) 22 December 1987 (1987-12-22) column 2, line 21 - line 29 column 7, line 37 - line 42 claims 1-3</p>	1-27

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/03/04476

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4641287	A	03-02-1987	AU 580291 B2 AU 4086585 A CA 1240782 A1	12-01-1989 07-11-1985 16-08-1988
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WO 8403153	A	16-08-1984	NO 830358 A AU 2438584 A BR 8405066 A EP 0134804 A1 JP 60500383 T WO 8403153 A1	03-08-1984 30-08-1984 26-12-1984 27-03-1985 22-03-1985 16-08-1984
US 4715018	A	22-12-1987	NONE	